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Case Report

Atrial myxoma presenting as total occlusion of the abdominal aorta and its major four branches

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Abstract

The presentations of cardiac myxoma are diverse, from asymptomatic to a variety of symptoms due to embolization. Occlusion of abdominal aortic bifurcation by straddled myxoma is not common; however, obstructive level above renal artery is very rare. We present a patient with cardiac myxoma who presented with acute onset of paraplegia. The aorta was occluded from the level of the liver dome to the renal arteries, and catastrophic outcome (ischemia/reperfusion) following its removal.

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1. Introduction

Myxoma is the most common primary cardiac tumor, and 75% of myxomas occur in the left atrium.^{1,2} Myxoma may be asymptomatic and discovered incidentally or it may present with a variety of symptoms due to embolization.³ When embolization occurs, most emboli occur in the cerebral arteries, followed by the renal artery and iliac femoropopliteal artery; occasionally, the infrarenal aorta to bifurcation may be blocked if the myxoma is large.^{1,4–6} However, total occlusion of aorta above the renal artery was never reported.

2. Case report

A 56-year-old previously healthy man had sudden onset of paraplegia with hypoesthesia at 9:30 PM when he vomited after drinking. He was sent to local hospital, where aortic lesion was

suspected. The patient was transferred to our hospital for further evaluation because no experienced cardiovascular surgeon was available at the local hospital.

On arrival at our emergency department at 12:30 AM, the patient was lucid but slightly irritable. He had persistent paraplegia with hypesthesia below the umbilicus. Tachypnea [respiratory rate 30 breaths per minute (bpm)], tachycardia (heart rate 110 bpm), high blood pressure of upper arms (154/74 mm Hg), and body temperature (BT) 34.2 °C were noted. Physical examination showed cold, dark red mottled skin below the umbilicus, wheezing, and rales bilaterally, normal heart sounds without murmur, and a soft abdomen with flank tenderness. Muscle strength was 0/5 in the lower limbs, and pulses were nearly absent in the femoral, popliteal, and dorsalis pedis arteries.

Laboratory tests revealed metabolic acidosis (pH 7.187, pCO₂ 37.9 mm Hg, HCO₃ 14.1 mM), blood urea nitrogen 19 mg/dL, serum creatinine (Cr) 1.99 mg/dL, amylase 99 U/L, lactic acid 78.7 mg/dL, and creatine kinase 122 U/L.

Electrocardiography revealed sinus tachycardia with premature ventricular contractions. Chest radiography revealed bilateral pulmonary edema. Multidetector computed tomography (MDCT) revealed thrombosis of the aorta

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(T12–L2), proximal celiac trunk, superior mesenteric artery (SMA), and bilateral renal arteries (Fig. 1). A cardiovascular surgeon was consulted and emergency surgery was scheduled.

After general anesthesia, the patient was positioned with the upper torso inclined at 45° toward the right side and the pelvis almost flat for the possibility of approaching to suprarenal aorta by a thoracoabdominal incision. First, an incision was made over the left inguinal area. Thromboembolectomy was attempted with a Fogarty catheter (6 French) via a femoral arteriotomy, but no thrombus could be retrieved. Therefore, a thoracoabdominal incision through the tenth intercostal space was taken to expose the aorta retroperitoneally for the purpose of thromboembolectomy of the individual branch. The suprarenal aorta was exposed, and the kidney was left *in situ*. The celiac trunk, SMA, and left renal artery and vein were identified. The proximal aorta was crossclamped, and transverse aortotomy was performed below the renal vein. A jelly-like mass was found and removed smoothly with forceps (Fig. 2). Aortotomy was repaired with 3-0 polypropylene. Reperfusion of the distal abdominal aorta and its four branches was confirmed only by intraoperative Doppler examination and the plethoric appearance of left renal cortex. Reperfusion of the abdominal branches and lower limbs was established 7 hours after the onset of symptoms.

Intraoperative transesophageal echocardiography showed a stalk in the left atrium (Fig. 3). Microscopic examination, including immunohistochemistry for DC34, confirmed that the mass was a cardiac myxoma several days later (Fig. 4). The surgical field was assessed meticulously for hemostasis and the splenic hilum was examined via a small incision of peritoneum for any laceration injury from traction, then the wound was closed in layers without tension. One Jackson-Pratt drain was placed in the splenic bed via the peritoneal incision and another chest tube in the pleural cavity. Fasciotomy was not



Fig. 2. A brown to red-brown gelatinous mass, 7.5 × 3 × 1.5 cm, retrieved from the abdominal aorta.

considered because there were no any signs of compartment syndrome in lower extremity.

On arrival in the postoperative room, sinus tachycardia, low blood pressure (60/40 mm Hg), and body temperature (32 °C) were noted despite a high dose of inotropic agents (dopamine 10.3 µg/kg/minute, epinephrine 0.38 µg/kg/minute).

Laboratory values showed intractable metabolic acidosis (pH 6.79, pCO₂ 83 mm Hg, HCO₃ 19 mM) and hyperkalemia (6.6 mM). Other remarkable values were white blood cell count, 19,400/mm³; platelets, 70,000/mm³, blood urea nitrogen, 20 mg/dL; and Cr, 2.16 mg/dL.

Drainage of bloody fluid from the Jackson-Pratt drain increased progressively after arrival in the postoperative room. Coagulants (desmopressin, ε-aminocaproic acid, and tranexamic acid) were given to correct the coagulopathy in addition to blood products and warm colloids. At 11:00 AM, coagulation profiles showed D-dimer 77.31 µg/mL, FDP 68.14 µg/mL, fibrinogen 281 mg/dL, and PT 22.1, APTT 123.7 seconds,

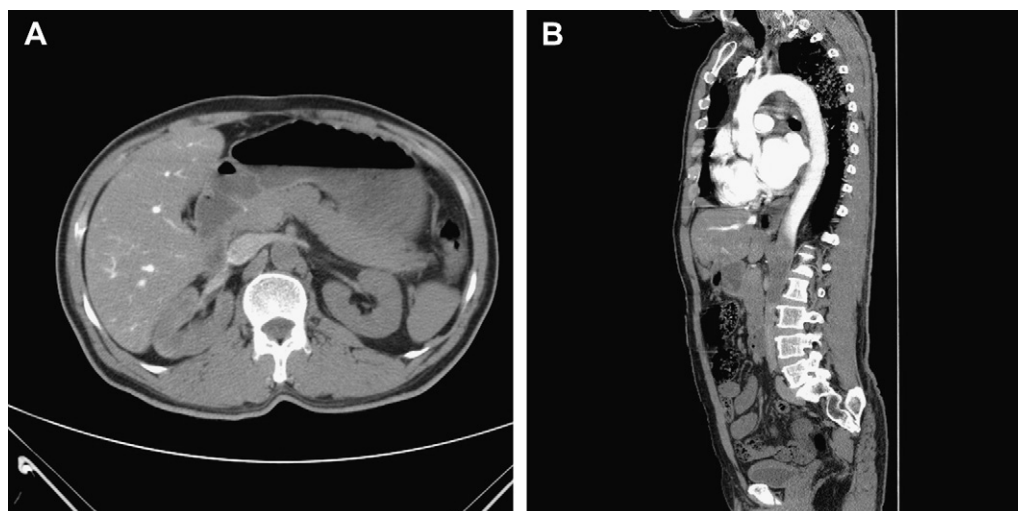


Fig. 1. Occlusion of proximal abdominal aorta viewed by multidetector computed tomography (CT). (A) Axial CT image showed no enhancement of abdominal aorta at the level of liver; (B) sagittal reformatted image showed complete occlusion of the aorta at the level of T12.

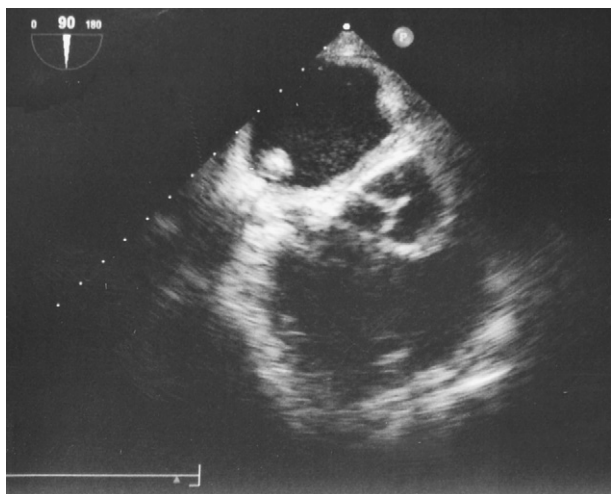


Fig. 3. Transesophageal echocardiogram in the midesophageal aortic valve short-axis view showed a soft tissue nodule with a stalk attached to the atrial septum.

consistent with disseminated intravascular coagulation. Other abnormal values were: amylase 166 mmol/L, lipase 386 mmol/L, and lactic acid 145.1 mg/dL. Continuous venovenous hemofiltration was instituted due to persistent anuria. Because of the persistently large volume of bloody fluid from Jackson-Pratt drainage and progressive abdominal distention, re-exploration for the source of bleeding was taken in the afternoon of the same day. The patient's blood pressure was 85/60 mm Hg, and body temperature was 31.7 °C. Arterial blood gas showed pH 7.28, pO_2 135 mm Hg, pCO_2 43 mm Hg, and HCO_3^- 20.2 mM. The thoracoabdominal wound was reopened. There was no active bleeding found in the retroperitoneum; however, a large volume of bloody fluid was flowed out from the peritoneal cavity. The peritoneal incision was extended and disclosed severe wet gangrene of the intestine from the jejunum to the midtransverse colon in addition to massive bloody ascites highly suggestive of ischemia/reperfusion injury. A gastrointestinal surgeon was consulted immediately. Because catastrophic outcome was

inevitable and the patient's family decided no further treatment, the wound was closed, and the patient was sent back to postoperative room. The patient died at 8:11 PM.

3. Discussion

In this patient, the myxoma occluded the aorta from the celiac trunk to the renal artery and four branches. Collateral circulation in the abdominal organs was almost completely blocked, resulting in severe ischemic injury of the intestine, spleen, ascending colon, and kidneys. After surgery allowed reperfusion, drained bloody ascites was increased progressively from gangrenous intestine, probably the result of reperfusion injury and an indirect sign of recovery of perfusion.

In light of this case, there are several points to be improved. First, the diagnosis of myxoma should be suspected in any previously healthy patients with sudden onset of lower limb weakness or paralysis and/or abdominal pain. Early suspicion of myxoma might change the surgical approach to an urgent midline laparotomy to expose the abdominal aorta when thromboembolism is unsuccessful via the femoral artery. Thoracoabdominal incision to expose the aorta retroperitoneally seems to be inappropriate because the chance of thromboembolism of individual branch is very low. Second, the peritoneal cavity should be entered and the gross appearance of internal organs could be evaluated before and after reperfusion immediately during the first operation. Third, the patient should have been left with a packed-open abdomen after the initial operation with plan to return for a "second look" operation because of the possibility of ischemia/reperfusion injury and abdominal compartment syndrome.

In our patient, we observed the catastrophic results of embolized atrial myxoma and/or ischemia/reperfusion injury. It was unfortunate that the myxoma was large enough to block perfusion of four major branches of the abdominal aorta. Actually, there was no time to wait further studies or to transfer this patient; survival would have necessitated prompt intervention at initial presentation.

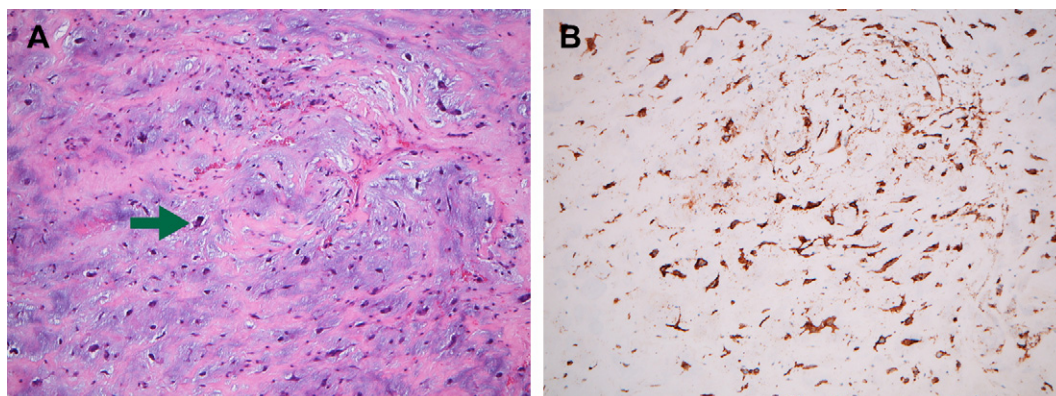


Fig. 4. (A) Histologically there are polygonal/elongated cells (myxoma cells) that often aggregate around vessels (H&E stain, 200 \times); (B) myxoma cells are diffuse positive for CD34 (200 \times).

In conclusion, the diagnosis of myxoma should be strongly suspected in acute onset of paraplegia with hypoesthesia and/or abdominal pain, especially in younger patients. Surgery should be performed urgently to retrieve the emboli and to decrease the risk of ischemia/reperfusion injury.

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